

REMARKS / ARGUMENTS

In complete response to the outstanding Official Action of March 11, 2005, on the above-identified application, reconsideration is respectfully requested.

Claims 13-17 remain in this application. Claims 1-12 have been cancelled.

Claim 13 has been amended to include the term "an air separation unit and a blast furnace" as claimed elements after the transition term. Support for this may be found throughout the specification. For example, on page 8, last paragraph, it states that "An illustration of an embodiment of an integrated air separation unit with a blast furnace is shown in Fig. 1. Generally, the present invention is composed of an air separation unit 1 and a blast furnace 2."

Claim 14 has been amended to include the term "further comprising a heater". Support for this may be found in the specification on page 9, last paragraph, wherein it states "In the embodiment disclosed Figure 1, a product stream 12, such as a nitrogen product or a nitrogen rich product, is withdrawn from air separation unit 1 and heated in a heater 5. Heater 5 may be an indirect heat exchanger or a direct heat exchanger, as is common in the art."

Claims 15 and 16 have been amended to include the term "further comprising a combustion chamber". Support for this may be found in the specification on page 11, first paragraph, wherein it states, "Further embodiments include the second stream being heated by a combustion product, removing an off gas, such as a low BTU off gas from the blast furnace, and combusting the off gas in a combustion chamber."

Claim 17 has been amended to include the term "further comprising a compressor". Support for this may be found in the specification on page 9, first paragraph, wherein it states 'Additional air 9 may be compressed in at least on compressor 8 before mixing with stream 3.'

Claim Rejections Under 35 U.S.C. § 103

Claims 13-17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ha et al '053. Applicants respectfully submit that claims 13-17, as currently amended, are not unpatentable over Ha et al '053. Claim 13 introduces the element of a blast furnace which is neither taught nor suggested by Ha et al '053, thereby rendering this rejection moot. These rejections, as applied to claims 14-17, are also moot, since these claims are dependent upon claim 13.

Claims 13-17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Brugerolle et al '207. Applicants respectfully submit that claims 13-17, as currently amended, are not unpatentable Brugerolle et al '207. Claim 13 introduces the element of a blast furnace which is neither taught nor suggested by Brugerolle et al '207, thereby rendering this rejection moot. These rejections, as applied to claims 14-17, are also moot, since these claims are dependent upon claim 13.

Claims 13-17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ha et al '549. Applicants respectfully submit that Ha et al '549 is not valid prior art, as the present application is a continuation of the Ha et al '549 application, and both the present application and Ha et al '549 claim priority back to the same application (10/027,482).

Claims 13-17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Atherton '074. Applicants respectfully submit that claims 13-17 are not unpatentable over Atherton '074.

The presently claimed invention, differs from the disclosure in Atherton '074 since process disclosed in Atherton '074 fails to utilize the air separation unit's (non-oxygen-rich) second stream after separation for any useful purpose. The process of the presently claimed invention utilizes the (non-oxygen-rich) second stream to generate internally consumed power, thereby making the cycle more efficient.

The process disclosed in Atherton '074 sends an oxygen slip-stream to the burner, where it is the oxidizing agent that combusts with the compressed fuel, the products of this combustion are subsequently expanded in the turbine to generate shaft power. In Atherton '074 some of the heat in this turbine exhaust is recovered in the regenerator (14), but most of the heat is lost to the atmosphere.

In contrast, the presently claimed invention sends the second stream to be heated (not directly combusted) and then expanded in a turbine to recover energy, therefore, generating useful power.

Both the process disclosed in Atherton '074, and the process of the claimed present invention use blast furnace off-gas as a potential fuel. The process disclosed in Atherton '074 sends this blast furnace gas first to a fuel compressor (34), then to a burner (32), then to an expansion turbine (6), to a regenerator (14), and finally to a stack (48). It is well known to one of ordinary skill in the art that the burner (32), expansion turbine (6) and regenerator (14) will all be prone to fouling due to the blast furnace gas plating.

In the process of the presently claimed invention, said blast furnace gas is burned in a typical combustor, which are commercially available, and designed specifically for burning blast furnace gas. In the process of the presently claimed invention, said fouling and plating potential from the blast furnace gas is not introduced into the second stream, since any combustion products arising from the burning of this blast furnace gas is isolated from this second stream by indirect heat exchange in the heater (5). Therefore, in the process of the presently claimed invention the expansion turbine will not experience the high maintenance, and subsequent down-time of the turbine in the process disclosed in Atherton '074. Also, the turbine in the presently claimed invention will have a relatively high energy content, which will result in a smaller, less expensive and relatively efficient turbine which generates a relatively greater amount of power, thereby making it easier to justify economically.

By the very design of a typical air separation unit, the product nitrogen will be under pressure. By heating this compressed nitrogen stream and then expanding it, thereby resulting in a low pressure product nitrogen stream of appropriate temperature for introduction into an industrial process, the process of the present invention is more efficient than that disclosed in Atherton '074. The only heat that is rejected to the atmosphere is the result of the generation of the relatively small amount of heat required by the heat exchange (5) with the nitrogen stream prior to entering the expansion turbine.

Since claim 13 is allowable over the prior art, for the above stated reasons, claims 14-17 are also allowable since they are dependent upon them.

Double Patenting

Claims 13-17 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-16 of Ha et al '053. Applicants respectfully submit that claims 13-17, as currently amended, are not unpatentable over Ha et al '053. Claim 13 introduces the element of a blast furnace which is neither taught nor suggested by Ha et al '053, thereby rendering these claims patentably distinct over 'claims 1-16 of Ha et al '053. These rejections, as applied to claims 14-17, are also moot, since these claims are dependent upon claim 13.

Claims 13-17 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 10-16 of Brugerolle et al '207. Applicants respectfully submit that claims 13-17, as currently amended, are not unpatentable over Brugerolle et al '207. Claim 13 introduces the element of a blast furnace which is neither taught nor suggested by Brugerolle et al '207, thereby rendering these claims patentably distinct over 'claims 10-16 of Brugerolle et al '207. These rejections, as applied to claims 14-17, are also moot, since these claims are dependent upon claim 13.

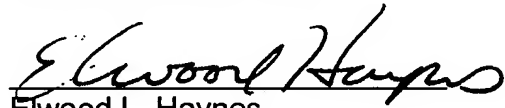
Application No. 10/776,872
Amendment dated June 7, 2005
Reply to Office Action of March 11, 2005

Claims 13-17 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-12 of Ha et al '549. The present application is a continuation of the Ha et al '549 application, and both the present application and Ha et al '549 claim priority back to the same application (10/027,482). Applicant respectfully overcomes this rejection with the concurrent filing of a terminal disclaimer.

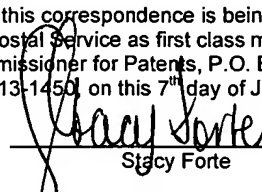
CONCLUSION

Accordingly, it is believed that the present application now stands in condition for allowance. Early notice to this effect is earnestly solicited. Should the examiner believe a telephone call would expedite the prosecution of the application, he is invited to call the undersigned attorney at the number listed below.

Respectfully submitted,


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<p align="center">CERTIFICATE OF MAILING UNDER 37 CFR 1.8(a)</p> <p>I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 7th day of June, 2005.</p> <p align="center"> Stacy Forte</p>
